

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
26 July 2001 (26.07.2001)

PCT

(10) International Publication Number
WO 01/53854 A1

(51) International Patent Classification⁷: G01V 1/36, 1/28

(21) International Application Number: PCT/GB01/00186

(22) International Filing Date: 19 January 2001 (19.01.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0001355.7 21 January 2000 (21.01.2000) GB
0003406.6 15 February 2000 (15.02.2000) GB

(71) Applicants (*for all designated States except US*):
SCHLUMBERGER HOLDINGS LIMITED [—/—];
Craigmuir Chambers, Road Town, P.O. Box 71, Tortola (VG). **SCHLUMBERGER CANADA LIMITED**

[CA/CA]; 24th floor, Monenco Place, 801 6th Avenue, S.W., Calgary, Alberta T2P 3W2 (CA). **SERVICES PETROLIERS SCHLUMBERGER** [FR/FR]; 42, rue Saint-Dominique, F-75007 Paris (FR).

(72) Inventors; and

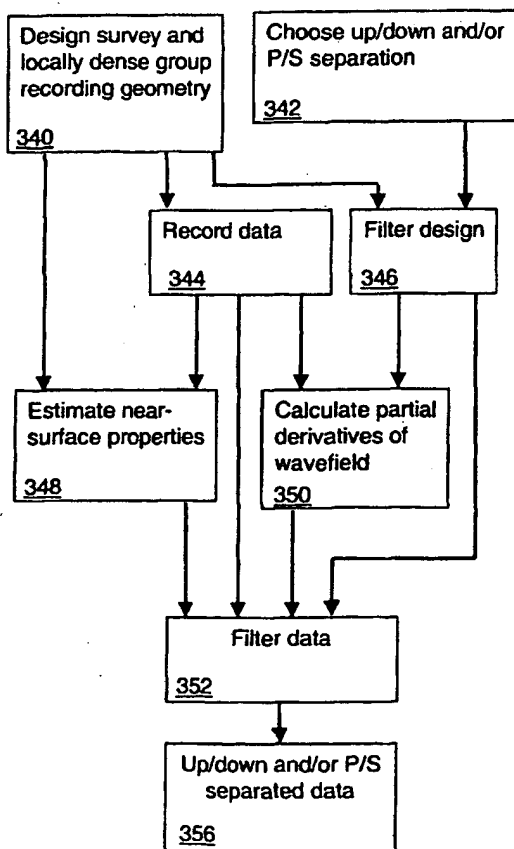
(75) Inventors/Applicants (*for US only*): **ROBERTSSON, Johan, Olof, Anders** [SE/NO]; Stasjonsveien 28A, N-0772 Oslo (NO). **CURTIS, Andrew** [GB/GB]; 68 Church Lane, Girton, Cambridge CB3 0JP (GB).

(74) Agent: **WANG, William, L.**; Intellectual Property Law Department, Schlumberger Cambridge Research Limited, High Cross, Madingley Road, Cambridge CB3 0EL (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR SEISMIC WAVEFIELD SEPARATION



(57) Abstract: A system and method of creating a filter for use with locally dense seismic data is disclosed. The method includes obtaining survey geometry characteristics from a locally dense seismic survey. A filter is designed which uses spatial derivatives of the wavefield of order between (1) and the maximum order of spatial derivatives of the wavefield that can be estimated within a group. The filter can be designed so as to separate up/down going components, p/s components, or both up/down and p/s components. Partial derivatives in space and time of the wavefield can be calculated, using, for example, a Taylor series expansion as an approximation. The seismic data is filtered by combining estimated near surface material properties, the seismic data, and the calculated partial derivatives.

WO 01/53854 A1